What is claimed is:

1. An X-ray generating apparatus, comprising:
a semiconductor structure;
an emitter formed on the semiconductor structure, the emitter to emit electrons; and
an element to generate X-rays in response to impact by the electrons on the element.

2. The X-ray generating apparatus of claim 1, further comprising a deflecting mechanism to deflect a path of the electrons.

3. The X-ray generating apparatus of claim 2, wherein the deflecting mechanism is adapted to deflect the electrons from a first path to a second path, the first path being at a non-zero angle with respect to the second path.

4. The X-ray generating apparatus of claim 3, wherein the deflecting mechanism is adapted to generate an electric field to deflect the electrons.

5. The X-ray generating apparatus of claim 3, wherein the deflecting mechanism is adapted to generate a magnetic field to deflect the electrons.

6. The X-ray generating apparatus of claim 1, wherein the emitter comprises a field emitter.

7. The X-ray generating apparatus of claim 1, wherein the emitter comprises a pointed tip and elements to apply an electric field to cause emission of electrons from the pointed tip.

8. The X-ray generating apparatus of claim 7, wherein the emitter further comprises a lens element to focus the electrons emitted from the pointed tip.

9. The X-ray generating apparatus of claim 7, wherein the emitter further comprises a lens element to collimate the electrons emitted from the pointed tip.

10. The X-ray generating apparatus of claim 1, further comprising an accelerator having electrodes formed on the semiconductor structure, the accelerator to accelerate the electrons.

11. The X-ray generating apparatus of claim 10, further comprising a magnetic device to apply a magnetic field to cause the electrons to travel in a curved path.

12. The X-ray generating apparatus of claim 11, wherein the accelerator is positioned to be immersed in the magnetic field.

13. The X-ray generating apparatus of claim 11, further comprising circuitry to apply alternating current (AC) signals to the electrodes.

14. The X-ray generating apparatus of claim 13, wherein the accelerator comprises a cyclotron.

15. The X-ray generating apparatus of claim 11, wherein the magnetic field varies radially along a direction in a plane parallel to a surface of the semiconductor structure.

16. The X-ray generating apparatus of claim 10, further comprising a second semiconductor structure and additional electrodes formed on the second semiconductor structure, the additional electrodes being part of the accelerator.

17. The X-ray generating apparatus of claim 16, wherein the semiconductor structures comprise semiconductor dies.

18. The X-ray generating apparatus of claim 16, wherein the semiconductor structures have respective surfaces that are generally parallel to each other, the X-ray generating apparatus further comprising a deflecting mechanism to deflect the electrons from a first path to a second path,

the second path being generally parallel to the surfaces of the semiconductor structures.

19. The X-ray generating apparatus of claim 1, wherein the element is formed of a material containing tungsten.

20. The X-ray generating apparatus of claim 1, wherein the element is formed of a material containing molybdenum.

21. A method of generating X-rays, comprising:

activating an emitter on a semiconductor structure to emit electrons; and

directing the electrons onto a target to cause the target to generate X-rays.

22. The method of claim 21, wherein activating the emitter comprises generating an electric field to cause emission of electrons from a pointed tip in the emitter.

23. The method of claim 22, further comprising collimating the emitted electrons using a lens element.

24. The method of claim 21, further comprising deflecting the emitted electrons from a first path to a second path.

25. The method of claim 24, further comprising accelerating the electrons traveling in the second path to increase an energy of the electrons prior to impact of the electrons onto the target.

26. The method of claim 25, wherein accelerating the electrons comprises accelerating the electrons with an accelerator having electrodes formed on the semiconductor structure.

27. The method of claim 26, further comprising applying a magnetic field, the accelerator immersed in the magnetic field.

28. The method of claim 27, further comprising varying the magnetic field radially from a point on the semiconductor structure across a plane parallel to a surface of the semiconductor structure.

29. An X-ray source device, comprising:
a housing defining a chamber;
a semiconductor structure disposed in the chamber, the chamber containing a vacuum;
a field emitter formed on the semiconductor structure to emit electrons; and
a target in the chamber to generate X-rays in response to impact by the electrons.

30. The X-ray source device of claim 29, further comprising an accelerator having electrodes formed on the semiconductor structure, the accelerator to accelerate the electrons prior to impact on the target.

31. The X-ray source device of claim 30, further comprising a magnetic device to generate a magnetic field to cause the electrons to travel in a curved path as the electrons are accelerated by the accelerator.

32. An X-ray source device, comprising:
a housing defining a chamber;
at least two semiconductor structures disposed in the chamber, the chamber containing a vacuum, the at least two semiconductor structures being generally parallel to each other;
a field emitter formed on one of the at least two semiconductor structures to emit electrons;
a deflecting mechanism in the chamber to deflect the electrons from a first path to a second path; and
a target in the chamber to generate X-rays in response to impact by the electrons.